Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (cancelled)

Claim 2 (previously presented): A network element arranged to be coupled within a working path of an optical network, the network element comprising:

a plurality of ports including first and second ports arranged to be coupled to Optical Carrier (OC) links within the working path;

a switch fabric connected to the plurality of ports and configured to couple the first and second ports such that data traffic received on one of the first and second ports is output on the other; and

a control unit, connected to the switch fabric, that operates to monitor for a failure within the working path and, if a failure is detected in the working path, to determine protection switching data corresponding to the failure and to insert the protection switching data within the data traffic being output from at least one of the first and second ports,

wherein the data traffic comprises a plurality of data units, each data unit comprising a path overhead that further comprises at least one protection byte; and

wherein to insert the protection switching data within the data traffic, the control unit inserts the protection switching data within the at least one protection byte.

Claim 3 (original): A network element according to claim 2, wherein each of the data units comprises a Synchronous Transport Signal Level 1 (STS-1) and the at least one protection byte comprises at least one of the Z3 and Z4 bytes defined within the path overhead of each STS-1.

Claim 4 (previously presented): A network element according to claim 2 further comprising a table that includes at least one protection entry;

wherein to determine protection switching data corresponding to the failure, the control unit operates to look-up a protection entry within the ~~routing~~ table corresponding to the failure within the working path, the protection entry comprising the protection switching data.

Claim 5 (previously presented): A network element according to claim 2, wherein the protection switching data comprises a plurality of switching instructions for switch fabrics within network elements associated with a protection path for the data traffic.

Claim 6 (original): A network element according to claim 5, wherein the plurality of ports further includes a third port arranged to be coupled to a protection path OC link;
wherein a switching instruction within the protection switching data dictates the reconfiguration of the switch fabric such that the first and third ports are coupled together; and
wherein, if a failure is detected within the working path, the control unit further operates to reconfigure the switch fabric according to the corresponding switching instruction.

Claim 7 (previously presented): A network element according to claim 2, wherein the data traffic is defined by the Synchronous Optical Network (SONET) standard.

Claim 8 (previously presented): A network element according to claim 2, wherein the data traffic is defined by the Synchronous Digital Hierarchy (SDH) standard.

Claim 9 (cancelled)

Claim 10 (previously presented): A network element arranged to be assigned within a protection path of an optical network, the network element comprising:

a plurality of ports;

a switch fabric connected to each of the ports; and

a control unit, connected to the switch fabric, that operates to monitor for changes in protection switching data within data traffic received at one of the ports and, if the protection switching data has changed, to process the protection switching data in order to determine if any switching instructions within the protection switching data relate to the network element and, if at least one of the switching instructions relate to the network element, to reconfigure

the switch fabric according to the switching instruction related to the network element such that the network element is configured within a protection path of the optical network,

wherein the data traffic comprises a plurality of data units, each data unit comprising a path overhead that further comprises at least one protection byte; and

wherein the protection switching data within the data traffic is located within the at least one protection byte.

Claim 11 (original): A network element according to claim 10, wherein each of the data units comprises a Synchronous Transport Signal Level 1 (STS-1) and the at least one protection byte comprises at least one of the Z3 and Z4 bytes defined within the path overhead of each STS-1.

Claim 12 (previously presented): A network element according to claim 10, wherein the plurality of ports include first and second ports arranged to be coupled to Optical Carrier (OC) links within a working path;

wherein the switch fabric is configured to couple the first and second ports such that data traffic received on one of the first and second ports is output on the other; and

wherein the control unit further operates to monitor for a failure within the working path and, if a failure is detected in the working path, to determine protection switching data corresponding to the failure and to insert the protection switching data within the data traffic being output from at least one of the first and second ports.

Claim 13 (previously presented): A network element according to claim 12 further comprising a table that includes at least one protection entry;

wherein to determine protection switching data corresponding to the failure, the control unit operates to look up a protection entry within the table corresponding to the failure within the working path, the protection entry comprising the protection switching data.

Claim 14 (previously presented): A network element according to claim 10, wherein the data traffic is defined by the Synchronous Optical Network (SONET) standard.

Claim 15 (previously presented): A network element according to claim 10, wherein the data traffic is defined by the Synchronous Digital Hierarchy (SDH) standard.

Claim 16 (previously presented): A method for establishing an optical communication network of network elements and Optical Carrier (OC) links, the method comprising:

configuring a working path for data traffic between a first path-terminating network element and a second path-terminating network element via a first set of the OC links; and

assigning at least one protection path for data traffic between the first path-terminating network element and the second path-terminating network element via a second set of the OC links, at least one path of the working path and the at least one protection path comprising a network element other than the first path-terminating network element and the second path-terminating network element, and the assigning at least one protection path comprising:

inserting protection entries into tables within network elements that can detect failures within the working path, the protection entries comprising protection switching data that indicates switch fabric modifications necessary to configure the protection path between the first network element and the second network element.

Claim 17 (original): A method according to claim 16, wherein the configuring a working path for data traffic comprises configuring switch fabrics within a plurality of the network elements to transmit the data traffic through the working path.

Claim 18 (original): A method according to claim 17, wherein the configuring a working path for data traffic further comprises reserving bandwidth for the data traffic to traverse the first set of OC links.

Claim 19 (original): A method according to claim 16, wherein the assigning at least one protection path for data traffic further comprises reserving bandwidth for the data traffic to traverse the second set of OC links.

Claim 20 (original): A method according to claim 16, wherein the assigning at least one protection path for data traffic comprises assigning a plurality of protection paths for data

traffic from the first network element to the second network element via a plurality of corresponding sets of OC links.

Claim 21 (cancelled)

Claim 22 (previously presented): A method for configuring a pre-assigned protection path within an optical network during a failure within a pre-configured working path, the method comprising:

monitoring for a failure indication within the pre-configured working path; and

if a failure indication is detected within the working path:

determining protection switching data corresponding to the failure;

transporting the protection switching data within the data traffic to network elements of the protection path, the data traffic comprising a plurality of data units and each data unit comprising a path overhead that further comprises at least one protection byte, the transporting the protection switching data within the data traffic comprising inserting the protection switching data within the at least one protection byte of the path overhead and forwarding the data traffic; and

processing the protection switching data at each of the network elements that requires reconfiguration such that their corresponding switch fabrics are reconfigured.

Claim 23 (original): A method according to claim 22, wherein each of the data units comprises a Synchronous Transport Signal Level 1 (STS-1) and the at least one protection byte comprises at least one of the Z3 and Z4 bytes defined within the path overhead of each STS-1.

Claim 24 (previously presented): A method according to claim 22, wherein the determining a protection switching data corresponding to the failure comprises looking-up a protection entry within a table corresponding to the failure indication, the protection entry comprising the protection switching data.

Claim 25 (previously presented): A method according to claim 22, wherein the protection switching data comprises a plurality of switching instructions for the network elements of the protection path that require switching.

Claim 26 (cancelled)

Claim 27 (previously presented): A network according to claim 28, wherein, if a failure occurs within the working path, at least one of the network elements of the first set operates to detect the failure, to determine protection switching data by looking up the corresponding protection entry within its table and to insert the determined protection switching data including its switching instructions into the data traffic.

Claim 28 (previously presented): An optical communication network of network elements coupled together with Optical Carrier (OC) links, the optical communication network comprising:

a working path comprising a first set of OC links and network elements that are configured to transmit data traffic between first and second path-terminating network elements; and

at least one protection path comprising a second set of OC links and network elements that are assigned to transmit data traffic between the first and second path-terminating network elements if a failure is detected on the working path;

wherein tables within the network elements of the working path comprise a protection entry that dictates switching instructions that must be applied to the network elements of the protection path to configure the protection path, and

wherein the data traffic comprises a plurality of data units, each data unit comprising a path overhead that further comprises at least one protection byte; and

wherein to insert the determined protection switching data into the data traffic, the particular network element operates to insert the protection switching data within the at least one protection byte.

Claim 29 (original): A network according to claim 28, wherein each of the data units comprises a Synchronous Transport Signal Level 1 (STS-1) and the at least one protection

byte comprises at least one of the Z3 and Z4 bytes defined within the path overhead of each STS-1.

Claim 30 (previously presented): A network according to claim 28, wherein each of the network elements within the first set comprises a switch fabric configured to transmit the data traffic through the working path.

Claim 31 (previously presented): An optical communication network of network elements coupled together with Optical Carrier (OC) links, the optical communication network comprising:

a working path comprising a first set of OC links and network elements that are configured to transmit data traffic between first and second path-terminating network elements, each of the OC links within the first set comprising reserved bandwidth for the data traffic to traverse the working path; and

at least one protection path comprising a second set of OC links and network elements that are assigned to transmit data traffic between the first and second path-terminating network elements if a failure is detected on the working path;

wherein tables within the network elements of the working path comprise a protection entry that dictates switching instructions that must be applied to the network elements of the protection path to configure the protection path.

Claim 32 (previously presented): An optical communication network of network elements coupled together with Optical Carrier (OC) links, the optical communication network comprising:

a working path comprising a first set of OC links and network elements that are configured to transmit data traffic between first and second path-terminating network elements; and

at least one protection path comprising a second set of OC links and network elements that are assigned to transmit data traffic between the first and second path-terminating network elements if a failure is detected on the working path, each of the OC links of the second set comprising reserved bandwidth for the data traffic to traverse the protection path

wherein tables within the network elements of the working path comprise a protection entry that dictates switching instructions that must be applied to the network elements of the protection path to configure the protection path.

Claim 33 (previously presented): A network according to claim 28, wherein at least one of the network elements of the first set is within the second set.

Claim 34 (previously presented): A network according to claim 28, wherein the data traffic is defined by the Synchronous Optical Network (SONET) standard.

Claim 35 (previously presented): A network according to claim 28, wherein the data traffic is defined by the Synchronous Digital Hierarchy (SDH) standard.

Claim 36 (previously presented): A network element arranged to be coupled within a working path of an optical network, the network element comprising:

means for monitoring for a failure within the working path;

means for determining protection switching data corresponding to the failure if a failure is detected in the working path;

means for inserting the determined protection switching data within data traffic; and

means for outputting the data traffic with the determined protection switching data inserted,

wherein the data traffic comprises a plurality of data units, each data unit comprising a path overhead that further comprises at least one protection byte; and

wherein to insert the protection switching data within the data traffic, the means for inserting the determined protection switching data inserts the protection switching data within the at least one protection byte.

Claim 37 (previously presented): A network element arranged to be assigned within a protection path of an optical network, the network element comprising:

means for receiving data traffic, the data traffic comprising a plurality of data units, each data unit comprising a path overhead that further comprises at least one protection byte and the protection switching data being located within the at least one protection byte;

means for monitoring for changes in protection switching data within the received data traffic; and

means for processing the protection switching data in the case that the protection switching data has changed; and

wherein the means for processing the protection switching data comprises means for reconfiguring the network element in the case that the protection switching data comprises a switching instruction related to the network element.

Claim 38 (currently amended): A data signal embodied in a transmission medium comprising:

a data frame comprising:

a transport overhead; and

a Synchronous Payload Envelope (SPE), the SPE comprising a path overhead and a payload;

wherein protection switching data is inserted within the path overhead and transmitted via said data signal for providing switching instructions to a network element.

Claim 39 (currently amended): A ~~data frame~~ data signal according to claim 38, wherein the protection switching data is inserted within at least one of the Z3 and Z4 bytes within the path overhead.

Claim 40 (currently amended): A ~~data frame~~ data signal according to claim 38, wherein the data frame is a Synchronous Optical NETwork (SONET) frame.

Claim 41 (currently amended): A ~~data frame~~ data signal according to claim 38, wherein the data frame is a Synchronous Digital Hierarchy (SDH) frame.

Claim 42 (previously presented): A network element according to claim 2 wherein the protection path comprises a plurality of network elements, and wherein the protection switching data within the data traffic comprises switching instructions for reconfiguring each one of the plurality of network elements of the protection path that requires reconfiguration to configure the protection path, at least one of the plurality of network elements of the protection path being a network element other than a path-terminating element of the working path.

Claim 43 (previously presented): A network element according to claim 10 wherein the protection switching data is generated by a network element within a working path associated with the protection path and is adapted to be transported to network elements of the protection path, at least one of the network elements of the protection path being a network element other than a path-terminating element of the working path.

Claim 44 (previously presented): A method according to claim 16 wherein the protection path comprises a plurality of network elements.

Claim 45 (currently amended): A ~~data frame~~ data signal according to claim 38 wherein the protection switching data is inserted within the path overhead to be transported to network elements of a protection path and provide switching instructions to ~~the~~ network elements of the protection path that require reconfiguration, at least one of the network elements of the protection path being other than a path-terminating element of a corresponding working path.

Claim 46 (previously presented): A network according to claim 28 wherein the network elements are coupled together with the OC links to form a mesh network.

Claim 47 (previously presented): A network according to claim 28 comprising means for assigning the protection path by adding protection entries to the tables.

Claim 48 (previously presented): A network according to claim 46 wherein each OC link within the first set comprises a working channel sector for the working path and at least one other channel sector from a group of channel sectors consisting of an unprotected channel sector, a protection channel sector, and an unassigned channel sector, each one of the working channel sector and the at least one other channel sector having a respective reserved bandwidth.

Claim 49 (previously presented): A network according to claim 46 wherein each OC link within the first set has a working channel sector and at least one other channel sector selected from the group consisting of an unprotected channel sector, a protection channel sector, and an

unassigned channel sector, the at least one other channel sector each having a respective reserved bandwidth, and wherein the respective bandwidths of a first OC link of the first set being different than the respective bandwidths of a second OC link of the first set.

Claim 50 (previously presented): A network according to claim 28 wherein at least some of the instructions are switching instructions that must be applied to the first and second path-terminating network elements.

Claim 51 (previously presented): A method according to claim 16 wherein the protection switching data also indicates switch fabric modifications to network elements of the second set of OC links and network elements.

Claim 52 (previously presented): A method according to claim 16 wherein the first set and the second set each comprise a plurality of OC links.

Claim 53 (previously presented): A network according to claim 46 wherein the protection path comprises only a portion of an overall data path followed by the data traffic.

Claim 54 (previously presented): A network according to claim 28 wherein at least one OC link of the OC links of the first set comprises reserved bandwidths for the working path and for other data traffic other than the data traffic.

Claim 55 (previously presented): A network according to claim 54 wherein each OC link of the first set comprises a respective bandwidth reserved for the working path, the respective bandwidth of a first OC link of the first set being different than the respective bandwidth of a second OC link of the first set.

Claim 56 (previously presented): A network according to claim 46 wherein the working path comprises a first service access point to another network, and wherein the protection path comprises a second service access point to the other network.

Claim 57 (previously presented): A network according to claim 56 wherein the working path and the protection path comprise network elements of the other network.